

At least two other subgenera, *Glaphyopteris* (*D. decussata* and some few other species) and *Steiropteris* (*D. deltoidea* and five or six others) are represented in tropical America and the recently by me proposed new genus *Stigmatopteris* belongs to the Dryopterideæ. The Old World's species belong partly to the same subgenera, partly to others not represented in America. *Stigmatopteris*, *Goniopteris*, and *Glaphyopteris* are exclusively American.

COPENHAGEN, NOVEMBER, 1910.

Notes on Southern California ferns

C. C. KINGMAN

During the past year, which I have spent in Southern California, I have had opportunities for collecting and studying the western ferns in their native haunts, and I have enjoyed tramping over the mountains and exploring the canyons in search of these interesting plants.

At Pasadena, where I have spent most of my time, the foothills rise directly back of the city, and back of these hills lie the San Gabriel Mountains, a bold range of mountains having an elevation of five thousand feet, with several peaks, such as Mt. Lowe and Mt. Wilson, rising a thousand feet higher. These mountain sides are very steep and are difficult to climb, except by following the trails. On every side the mountains are furrowed by deep canyons, through each of which flows a small mountain stream that descends the canyon in a series of pretty waterfalls and cascades. These canyons are beautiful spots and are a paradise for the botanist, especially in the winter, when everything is fresh and green.

The cool, shady sides of the canyons are the favorite haunts of some of our finest ferns. Here among the damp mosses will be found the California polypody, *Polypodium californicum* Kaulf., which forms a thick

green carpet covering large areas. I have found large fronds of this species that measured nearly eighteen inches long.

Polypodium Scouleri H. & G. is occasionally found here, but it is not common in this part of the state. It closely resembles small forms of *P. californicum*, but differs from that species in its blunter pinnæ, its larger and more numerous sori, and in its more leathery texture.

The golden-back fern, *Gymnogramma triangularis* Kaulf., is everywhere abundant. It is the fern that tourists press and mail in their letters as souvenirs. It flourishes in both sunny and shady places. The back of the frond is covered with a yellow, mealy substance that gives it its golden color. I have collected this fern in all parts of Southern California and last July I found the shriveled fronds of this plant abundant on Catalina Island.

Scarcely less abundant are the Pellæas, or cliff brakes. These ferns grow in a rather dry situation and seem to flourish best on rocky hillsides. *Pellæa andromedifolia* (Kaulf.) Fée is a medium-sized fern with rounded segments. It is very common and may be collected along the sides of the mountain trails and in all the canyons. The bird's-foot cliff brake, *Pellæa ornithopus* Hooker, is less common and grows in clefts of the rocks. Its ultimate segments are oblong and are grouped in threes, which give it the name.

The lace fern, *Cheilanthes californica* (Nutt.) Mett., is the most beautiful of all the smaller ferns. The fronds, which are one to four inches long, are delicately cut into many fine segments. This, too, is a rock-loving species and is frequently found along the trails at an elevation of two thousand feet or more.

Pteris aquilina L. is occasionally found, although it is not as common here as in the eastern states. It often reaches a large size, and sometimes the variety *lanuginosa* is found, with the fronds woolly or tomentose.

The maidenhair ferns are found in damp, shady places, often in springy ground. There are several species, the commonest being *Adiantum emarginatum* Hook., with broad fronds and rounded pinnules. This species matures quite early in the spring and then turns brown. I have collected it at Pasadena and Santa Barbara, and also on Catalina Island, where it is abundant on the hills overlooking the ocean.

I have not found *Adiantum capillus-veneris* (Kaulf.) Fée common at Pasadena, but I have collected fine specimens of it near Santa Barbara. In the Ojai Valley, in Ventura County, I once found a large patch of this fern so thick that I was obliged to tread on hundreds of the plants in order to walk up the canyon. This species differs from *A. emarginatum* in its longer lanceolate fronds and in the more wedgeshaped pinnules, which are more lobed on the upper margin; and it matures later, so that fresh fronds may be gathered late in the summer.

Among the larger ferns is *Aspidium argutum* Kaulf. This is an evergreen fern, resembling *A. marginale* of the eastern states both in form and texture. It is quite common on the shady sides of canyons.

Polystichum munitum (Kaulf.) Und. is one of the finest of our western ferns, and is found in the upper canyons. It resembles the Christmas fern but is much larger in every way, the fronds being two or three feet long and often over six inches in width. I have collected it on the Mt. Wilson trail at an elevation of 4,000 feet. Here, too, I have found *Woodwardia radicans* (L.) Sm., one of the largest of our North American ferns. The magnificent fronds are often nearly as tall as a man and the separate pinnae are larger than the entire fronds of most of our ferns. As this fern takes kindly to cultivation it has been dug up and carried away, so that one must go out of the beaten path to find it in quantity. It is still quite common in the canyons near Santa Barbara.

In the winter the mountain sides are everywhere covered with *Selaginella rupestris* (L.) Spring. It is more upright and treelike than the eastern form. During a dry spell it appears to die away, but after a shower it immediately revives and becomes green again.

There are several species of *Equisetum*, the commonest being *Equisetum telmateia* Ehrh. The sterile plants resemble *E. arvense* but are twice as large. They may be found all summer near streams.

PASADENA, CAL.

A new Cuban fern

R. C. BENEDICT

(PLATE 2)

The discovery of the North or South Pole has never been of very great interest from the standpoint of botanical science, because there has been no prospect that such exploration would add any knowledge of botanical value. Geographically speaking, the botanically unexplored regions are practically all tropical, and such regions are still rather numerous. They occur principally in connection with high mountain ranges and on large islands. Some of these islands, like Java and Jamaica, are fairly well explored. Java is credited with about 600 species of ferns, and Jamaica has nearly as many, a large number of which are known only from this island.

But there are still several West Indian islands with high mountain ranges as yet only partly known, particularly Hayti, Porto Rico, and Cuba. In Cuba, for example, the highest range on the island, the Sierra Maestra, along the southern coast, has hardly been touched and probably contains a large number of ferns and other plants as yet undescribed.